

SEQUENCE LISTING

<110> ANDERSON, Peter et al.

<120> Tuberculosis vaccine and diagnostics
based on the *Mycobacterium tuberculosis* esat-6 gene family

<130> 0459-0462P

<140> 09/615,947

<141> 2000-07-13

<160> 31

<170> FastSEQ for Windows Version 3.0

<210> 1

<211> 100

<212> PRT

<213> *M. Tuberculosis*

<400> 1

Met Ala Glu Met Lys Thr Asp Ala Ala Thr Leu Ala Gln Glu Ala Gly
1 5 10 15
Asn Phe Glu Arg Ile Ser Gly Asp Leu Lys Thr Gln Ile Asp Gln Val
20 25 30
Glu Ser Thr Ala Gly Ser Leu Gln Gly Gln Trp Arg Gly Ala Ala Gly
35 40 45
Thr Ala Ala Gln Ala Ala Val Val Arg Phe Gln Glu Ala Ala Asn Lys
50 55 60
Gln Lys Gln Glu Leu Asp Glu Ile Ser Thr Asn Ile Arg Gln Ala Gly
65 70 75 80
Val Gln Tyr Ser Arg Ala Asp Glu Glu Gln Gln Ala Leu Ser Ser
85 90 95
Gln Met Gly Phe
100

<210> 2

<211> 95

<212> PRT

<213> *M. Tuberculosis*

<400> 2

Met Thr Glu Gln Gln Trp Asn Phe Ala Gly Ile Glu Ala Ala Ala Ser
1 5 10 15
Ala Ile Gln Gly Asn Val Thr Ser Ile His Ser Leu Leu Asp Glu Gly
20 25 30
Lys Gln Ser Leu Thr Lys Leu Ala Ala Ala Trp Gly Gly Ser Gly Ser
35 40 45
Glu Ala Tyr Gln Gly Val Gln Gln Lys Trp Asp Ala Thr Ala Thr Glu
50 55 60
Leu Asn Asn Ala Leu Gln Asn Leu Ala Arg Thr Ile Ser Glu Ala Gly
65 70 75 80
Gln Ala Met Ala Ser Thr Glu Gly Asn Val Thr Gly Met Phe Ala
85 90 95

<210> 3

<211> 96
 <212> PRT
 <213> M.Tuberculosis

<400> 3
 Met Ser Gln Ile Met Tyr Asn Tyr Pro Ala Met Leu Gly His Ala Gly
 1 5 10 15
 Asp Met Ala Gly Tyr Ala Gly Thr Leu Gln Ser Leu Gly Ala Glu Ile
 20 25 30
 Ala Val Glu Gln Ala Ala Leu Gln Ser Ala Trp Gln Gly Asp Thr Gly
 35 40 45
 Ile Thr Tyr Gln Ala Trp Gln Ala Gln Trp Asn Gln Ala Met Glu Asp
 50 55 60
 Leu Val Arg Ala Tyr His Ala Met Ser Ser Thr His Glu Ala Asn Thr
 65 70 75 80
 Met Ala Met Met Ala Arg Asp Thr Ala Glu Ala Ala Lys Trp Gly Gly
 85 90 95

<210> 4
 <211> 294
 <212> DNA
 <213> M Tuberculosis

<220>
 <221> CDS
 <222> (1)...(294)

<400> 4
 atg agc ctt ttg gat gct cat atc cca cag ttg gtg gcc tcc cag tcg
 48
 Met Ser Leu Leu Asp Ala His Ile Pro Gln Leu Val Ala Ser Gln Ser
 1 5 10 15
 gcg ttt gcc gcc aag gcg ggg ctg atg cgg cac acg atc ggt cag gcc
 96
 Ala Phe Ala Ala Lys Ala Gly Leu Met Arg His Thr Ile Gly Gln Ala
 20 25 30
 gag cag gcg gcg atg tcg gct cag gcg ttt cac cag ggg gag tcg tcg
 144
 Glu Gln Ala Ala Met Ser Ala Gln Ala Phe His Gln Gly Glu Ser Ser
 35 40 45
 gcg gcg ttt cag gcc cat gcc cgg ttt gtg gcg gcg gcc gcc aaa
 192
 Ala Ala Phe Gln Ala Ala His Ala Arg Phe Val Ala Ala Ala Lys
 50 55 60
 gtc aac acc ttg ttg gat gtc gcg cag gcg aat ctg ggt gag gcc gcc
 240
 Val Asn Thr Leu Leu Asp Val Ala Gln Ala Asn Leu Gly Glu Ala Ala
 65 70 75 80
 ggt acc tat gtg gcc gat gct gcg gcc gcg tcg acc tat acc ggg
 288
 Gly Thr Tyr Val Ala Ala Asp Ala Ala Ala Ser Thr Tyr Thr Gly
 85 90 95

ttc tga
 294

Phe *

<210> 5
<211> 97
<212> PRT
<213> M Tuberculosis

<400> 5
Met Ser Leu Leu Asp Ala His Ile Pro Gln Leu Val Ala Ser Gln Ser
1 5 10 15
Ala Phe Ala Ala Lys Ala Gly Leu Met Arg His Thr Ile Gly Gln Ala
20 25 30
Glu Gln Ala Ala Met Ser Ala Gln Ala Phe His Gln Gly Glu Ser Ser
35 40 45
Ala Ala Phe Gln Ala Ala His Ala Arg Phe Val Ala Ala Ala Lys
50 55 60
Val Asn Thr Leu Leu Asp Val Ala Gln Ala Asn Leu Gly Glu Ala Ala
65 70 75 80
Gly Thr Tyr Val Ala Ala Asp Ala Ala Ala Ser Thr Tyr Thr Gly
85 90 95

Phe

<210> 6
<211> 339
<212> DNA
<213> M Tuberculosis

<220>
<221> CDS
<222> (1)...(339)

<400> 6
ttg atc ccc ggt cgg atg gtg ctg aac tgg gaa gat ggc ctc aat gcc
48
Leu Ile Pro Gly Arg Met Val Leu Asn Trp Glu Asp Gly Leu Asn Ala
1 5 10 15
ctt gtt gcg gaa ggg att gag gcc atc gtg ttt cgt act tta ggc gat
96
Leu Val Ala Glu Gly Ile Glu Ala Ile Val Phe Arg Thr Leu Gly Asp
20 25 30
cag tgc tgg ttg tgg gag tcg ctg ccc gac gag gtg cgc cga ctg
144
Gln Cys Trp Leu Trp Glu Ser Leu Leu Pro Asp Glu Val Arg Arg Leu
35 40 45
ccc gag gaa ctg gcc cgg gtg gac gca ttg ttg gac gat ccg gcg ttc
192
Pro Glu Glu Leu Ala Arg Val Asp Ala Leu Leu Asp Asp Pro Ala Phe
50 55 60
ttc gcc ccg ttc gtg ccg ttc gac ccg cgc agg ggc cgg ccg tcg
240
Phe Ala Pro Phe Val Pro Phe Asp Pro Arg Arg Gly Arg Pro Ser
65 70 75 80

acg ccg atg gag gtc tat ctg cag ttg atg ttt gtg aag ttc cgc tac
 288
 Thr Pro Met Glu Val Tyr Leu Gln Leu Met Phe Val Lys Phe Arg Tyr
 85 90 95

 cg^g ctg ggc tat gag tcg ctg tgc cg^g gag gtg gct gat tcg atc acc
 336
 Arg Leu Gly Tyr Glu Ser Leu Cys Arg Glu Val Ala Asp Ser Ile Thr
 100 105 110

 tga
 339

<210> 7
 <211> 112
 <212> PRT
 <213> M Tuberculosis

<400> 7
 Met Ile Pro Gly Arg Met Val Leu Asn Trp Glu Asp Gly Leu Asn Ala
 1 5 10 15
 Leu Val Ala Glu Gly Ile Glu Ala Ile Val Phe Arg Thr Leu Gly Asp
 20 25 30
 Gln Cys Trp Leu Trp Glu Ser Leu Leu Pro Asp Glu Val Arg Arg Leu
 35 40 45
 Pro Glu Glu Leu Ala Arg Val Asp Ala Leu Leu Asp Asp Pro Ala Phe
 50 55 60
 Phe Ala Pro Phe Val Pro Phe Phe Asp Pro Arg Arg Gly Arg Pro Ser
 65 70 75 80
 Thr Pro Met Glu Val Tyr Leu Gln Leu Met Phe Val Lys Phe Arg Tyr
 85 90 95
 Arg Leu Gly Tyr Glu Ser Leu Cys Arg Glu Val Ala Asp Ser Ile Thr
 100 105 110

<210> 8
 <211> 285
 <212> DNA
 <213> M Tuberculosis

<220>
 <221> CDS
 <222> (1)...(285)

<400> 8
 atg acc atc aac tat caa ttc ggg gac gtc gac gct cac ggc gcc atg
 48
 Met Thr Ile Asn Tyr Gln Phe Gly Asp Val Asp Ala His Gly Ala Met
 1 5 10 15

 atc cgc gct cag gcc ggg tcg ctg gag gcc gag cat cag gcc atc att
 96
 Ile Arg Ala Gln Ala Gly Ser Leu Glu Ala Glu His Gln Ala Ile Ile
 20 25 30

 tct gat gtg ttg acc gcg agt gac ttt tgg ggc ggc gct tcg gcg
 144
 Ser Asp Val Leu Thr Ala Ser Asp Phe Trp Gly Gly Ala Gly Ser Ala
 35 40 45

gcc tgc cag ggg ttc att acc cag ctg ggc cgt aac ttc cag gtg atc
 192
 Ala Cys Gln Gly Phe Ile Thr Gln Leu Gly Arg Asn Phe Gln Val Ile
 50 55 60

 tac gag cag gcc aac gcc cac ggg cag aag gtg cag gct gcc ggc aac
 240
 Tyr Glu Gln Ala Asn Ala His Gly Gln Lys Val Gln Ala Ala Gly Asn
 65 70 75 80

 aac atg gca caa acc gac agc gcc gtc ggc tcc agc tgg gcc taa
 285
 Asn Met Ala Gln Thr Asp Ser Ala Val Gly Ser Ser Trp Ala *
 85 90

<210> 9
 <211> 94
 <212> PRT
 <213> M Tuberculosis

<400> 9
 Met Thr Ile Asn Tyr Gln Phe Gly Asp Val Asp Ala His Gly Ala Met
 1 5 10 15
 Ile Arg Ala Gln Ala Gly Leu Leu Glu Ala Glu His Gln Ala Ile Val
 20 25 30
 Arg Asp Val Leu Ala Ala Gly Asp Phe Trp Gly Gly Ala Gly Ser Val
 35 40 45
 Ala Cys Gln Glu Phe Ile Thr Gln Leu Gly Arg Asn Phe Gln Val Ile
 50 55 60
 Tyr Glu Gln Ala Asn Ala His Gly Gln Lys Val Gln Ala Ala Gly Asn
 65 70 75 80
 Asn Met Ala Gln Thr Asp Ser Ala Val Gly Ser Ser Trp Ala
 85 90

<210> 10
 <211> 285
 <212> DNA
 <213> M Tuberculosis

<220>
 <221> CDS
 <222> (1)...(282)

<400> 10
 atg acc atc aac tat cag ttc ggt gat gtc gac gct cat ggc gcc atg
 48
 Met Thr Ile Asn Tyr Gln Phe Gly Asp Val Asp Ala His Gly Ala Met
 1 5 10 15

 atc cgc gct cag gcc ggg ttg ctg gag gcg gag cat cag gcc atc gtt
 96
 Ile Arg Ala Gln Ala Gly Leu Leu Glu Ala Glu His Gln Ala Ile Val
 20 25 30

 cgt gat gtg ttg gcc gcg ggt gac ttt tgg ggc ggc ggt tcg gtg
 144
 Arg Asp Val Leu Ala Ala Gly Asp Phe Trp Gly Gly Ala Gly Ser Val
 35 40 45

gct tgc cag gag ttc att acc cag ttg ggc cgt aac ttc cag gtg atc
 192
 Ala Cys Gln Glu Phe Ile Thr Gln Leu Gly Arg Asn Phe Gln Val Ile
 50 55 60

tac gag cag gcc aac gcc cac ggg cag aag gtg cag gct gcc ggc aac
 240
 Tyr Glu Gln Ala Asn Ala His Gly Gln Lys Val Gln Ala Ala Gly Asn
 65 70 75 80

aac atg gca caa acc gac agc gcc gtc ggc tcc agc tgg gcc
 282
 Asn Met Ala Gln Thr Asp Ser Ala Val Gly Ser Ser Trp Ala
 85 90

tga
 285

<210> 11
 <211> 94
 <212> PRT
 <213> M Tuberculosis

<400> 11
 Met Thr Ile Asn Tyr Gln Phe Gly Asp Val Asp Ala His Gly Ala Met
 1 5 10 15
 Ile Arg Ala Gln Ala Gly Leu Leu Glu Ala Glu His Gln Ala Ile Val
 20 25 30
 Arg Asp Val Leu Ala Ala Gly Asp Phe Trp Gly Gly Ala Gly Ser Val
 35 40 45
 Ala Cys Gln Glu Phe Ile Thr Gln Leu Gly Arg Asn Phe Gln Val Ile
 50 55 60
 Tyr Glu Gln Ala Asn Ala His Gly Gln Lys Val Gln Ala Ala Gly Asn
 65 70 75 80

Asn Met Ala Gln Thr Asp Ser Ala Val Gly Ser Ser Trp Ala
 85 90

<210> 12
 <211> 327
 <212> DNA
 <213> M Tuberculosis

<220>
 <221> CDS
 <222> (1) ... (327)

<400> 12
 gtg ctt ttg cct ctt ggt ccg cct ttg ccg ccc gac gcg gtg gtg gcg
 48
 Val Leu Leu Pro Leu Gly Pro Pro Leu Pro Pro Asp Ala Val Val Ala
 1 5 10 15

aaa cgg gct gag tcg gga atg ctc ggc ggg ttg tcg gtt ccg ctc agc
 96
 Lys Arg Ala Glu Ser Gly Met Leu Gly Gly Leu Ser Val Pro Leu Ser
 20 25 30

tgg gga gtg gct gtg cca ccc gat gat tat gac cac tgg gcg cct gcg
 144
 Trp Gly Val Ala Val Pro Pro Asp Asp Tyr Asp His Trp Ala Pro Ala

35	40	45
ccg gag gac ggc gcc gat gtc gat gtc cag gcg gcc gaa ggg gcg gac		
192 Pro Glu Asp Gly Ala Asp Val Asp Val Gln Ala Ala Glu Gly Ala Asp		
50	55	60
gca gag gcc gcg gcc atg gac gag tgg gat gag tgg cag gcg tgg aac		
240 Ala Glu Ala Ala Ala Met Asp Glu Trp Asp Glu Trp Gln Ala Trp Asn		
65	70	75
gag tgg gtg gcg gag aac gct gaa ccc cgc ttt gag gtg cca cgg agt		
288 Glu Trp Val Ala Glu Asn Ala Glu Pro Arg Phe Glu Val Pro Arg Ser		
85	90	95
agc agc agc gtg att ccg cat tct ccg gcg gcc ggc tag		
327 Ser Ser Ser Val Ile Pro His Ser Pro Ala Ala Gly *		
100	105	
<210> 13		
<211> 108		
<212> PRT		
<213> M Tuberculosis		
<400> 13		
Met Leu Leu Pro Leu Gly Pro Pro Leu Pro Pro Asp Ala Val Val Ala		
1	5	10
Lys Arg Ala Glu Ser Gly Met Leu Gly Gly Leu Ser Val Pro Leu Ser		
20	25	30
Trp Gly Val Ala Val Pro Pro Asp Asp Tyr Asp His Trp Ala Pro Ala		
35	40	45
Pro Glu Asp Gly Ala Asp Val Asp Val Gln Ala Ala Glu Gly Ala Asp		
50	55	60
Ala Glu Ala Ala Ala Met Asp Glu Trp Asp Glu Trp Gln Ala Trp Asn		
65	70	75
Glu Trp Val Ala Glu Asn Ala Glu Pro Arg Phe Glu Val Pro Arg Ser		
85	90	95
Ser Ser Ser Val Ile Pro His Ser Pro Ala Ala Gly		
100	105	
<210> 14		
<211> 324		
<212> DNA		
<213> M Tuberculosis		
<220>		
<221> CDS		
<222> (1)...(324)		
<400> 14		
ttg acc cac aag cgc act aaa cgc cag cca gcc atc gcc gca ggg ctc		
48 Leu Thr His Lys Arg Thr Lys Arg Gln Pro Ala Ile Ala Ala Gly Leu		
1	5	10

aac gcc ccg cgt cggt aat cgc gtt ggg cggt caa cat ggt tgg ccg gcc
96

Asn Ala Pro Arg Arg Asn Arg Val Gly Arg Gln His Gly Trp Pro Ala
20 25 30

gac gtt ccg tcc gcc gag cag cgc cgc gcc caa cggt cag cgc gac ctc
144

Asp Val Pro Ser Ala Glu Gln Arg Arg Ala Gln Arg Gln Arg Asp Leu
35 40 45

gag gct atc cgc cga gct tac gcc gag atg gtg gcg aca tca cac gaa
192

Glu Ala Ile Arg Arg Ala Tyr Ala Glu Met Val Ala Thr Ser His Glu
50 55 60

atc gac gac aca gaa ctg gct ctg ttg tcg atg cat ctc gac
240

Ile Asp Asp Asp Thr Ala Glu Leu Ala Leu Leu Ser Met His Leu Asp
65 70 75 80

gat gag cag cgc cggt ctt gag gct ggg atg aag ctc ggc tgg cat ccg
288

Asp Glu Gln Arg Arg Leu Glu Ala Gly Met Lys Leu Gly Trp His Pro
85 90 95

tat cac ttc ccc gac gaa ccc gac agc aaa cag tga
324

Tyr His Phe Pro Asp Glu Pro Asp Ser Lys Gln *
100 105

<210> 15

<211> 107

<212> PRT

<213> M Tuberculosis

<400> 15

Met Thr His Lys Arg Thr Lys Arg Gln Pro Ala Ile Ala Ala Gly Leu
1 5 10 15

Asn Ala Pro Arg Arg Asn Arg Val Gly Arg Gln His Gly Trp Pro Ala
20 25 30

Asp Val Pro Ser Ala Glu Gln Arg Arg Ala Gln Arg Gln Arg Asp Leu
35 40 45

Glu Ala Ile Arg Arg Ala Tyr Ala Glu Met Val Ala Thr Ser His Glu
50 55 60

Ile Asp Asp Asp Thr Ala Glu Leu Ala Leu Leu Ser Met His Leu Asp
65 70 75 80

Asp Glu Gln Arg Arg Leu Glu Ala Gly Met Lys Leu Gly Trp His Pro
85 90 95

Tyr His Phe Pro Asp Glu Pro Asp Ser Lys Gln
100 105

<210> 16

<211> 246

<212> DNA

<213> M Tuberculosis

<220>

<221> CDS

<222> (1)...(246)

```

<400> 16
atg agc ggc cac gcg ttg gct gct cgg acg ttg ctg gcc gcc gcg gac
48
Met Ser Gly His Ala Leu Ala Ala Arg Thr Leu Leu Ala Ala Ala Asp
1 5 10 15

gag ctt gtc ggc ggc cca gtc gag gct tcg gcc gcc gcg ctg gcc
96
Glu Leu Val Gly Gly Pro Pro Val Glu Ala Ser Ala Ala Ala Leu Ala
20 25 30

ggc gac gcc gcg ggc gca tgg cgg acc gcg gcc gtc gag ctt gcg cga
144
Gly Asp Ala Ala Gly Ala Trp Arg Thr Ala Ala Val Glu Leu Ala Arg
35 40 45

gcg ttg gtc cgc gct gtg gcg gag tcg cac ggc gtc gcg gcc gtt ttg
192
Ala Leu Val Arg Ala Val Ala Glu Ser His Gly Val Ala Ala Val Leu
50 55 60

ttc gcc gcg acg gcc gcc gcg gcg gcc gtc gac cgg ggt gat ccg
240
Phe Ala Ala Thr Ala Ala Ala Ala Ala Val Asp Arg Gly Asp Pro
65 70 75 80

ccg tga
246
Pro *

```

```

<210> 17
<211> 81
<212> PRT
<213> M Tuberculosis

<400> 17
Met Ser Gly His Ala Leu Ala Ala Arg Thr Leu Leu Ala Ala Ala Asp
1 5 10 15
Glu Leu Val Gly Gly Pro Pro Val Glu Ala Ser Ala Ala Leu Ala
20 25 30
Gly Asp Ala Ala Gly Ala Trp Arg Thr Ala Ala Val Glu Leu Ala Arg
35 40 45
Ala Leu Val Arg Ala Val Ala Glu Ser His Gly Val Ala Ala Val Leu
50 55 60
Phe Ala Ala Thr Ala Ala Ala Ala Ala Val Asp Arg Gly Asp Pro
65 70 75 80
Pro

```

```

<210> 18
<211> 294
<212> DNA
<213> M Tuberculosis

<220>
<221> CDS
<222> (1)...(294)

```

<400> 18
 atg agt ttg ttg gat gcc cat att ccg cag ttg atc gct tcg cat acg
 48
 Met Ser Leu Leu Asp Ala His Ile Pro Gln Leu Ile Ala Ser His Thr
 1 5 10 15
 gcg ttt gcc gct aag gcg ggg ttg atg ccg cat acg atc ggt cag gcc
 96
 Ala Phe Ala Ala Lys Ala Gly Leu Met Arg His Thr Ile Gly Gln Ala
 20 25 30
 gag cag cag gcg atg tcg gcg cag gcg ttt cat cag gga gag tcc gcg
 144
 Glu Gln Gln Ala Met Ser Ala Gln Ala Phe His Gln Gly Glu Ser Ala
 35 40 45
 gcg gcg ttt cag ggt gcg cat gcc ccg ttt gtg gcc gcg gcc gcc aag
 192
 Ala Ala Phe Gln Gly Ala His Ala Arg Phe Val Ala Ala Ala Lys
 50 55 60
 gtc aat acc ttg ctg gat atc gcg caa gcc aat ttg ggt gag gcc gcg
 240
 Val Asn Thr Leu Leu Asp Ile Ala Gln Ala Asn Leu Gly Glu Ala Ala
 65 70 75 80
 ggc acg tat gtg gcc gat gcc gcc gcg tcc agc tac acc ggg
 288
 Gly Thr Tyr Val Ala Ala Asp Ala Ala Ala Ser Ser Tyr Thr Gly
 85 90 95
 ttt tta
 294
 Phe Leu

<210> 19
 <211> 97
 <212> PRT
 <213> M Tuberculosis

<400> 19
 Met Ser Leu Leu Asp Ala His Ile Pro Gln Leu Ile Ala Ser His Thr
 1 5 10 15
 Ala Phe Ala Ala Lys Ala Gly Leu Met Arg His Thr Ile Gly Gln Ala
 20 25 30
 Glu Gln Gln Ala Met Ser Ala Gln Ala Phe His Gln Gly Glu Ser Ala
 35 40 45
 Ala Ala Phe Gln Gly Ala His Ala Arg Phe Val Ala Ala Ala Lys
 50 55 60
 Val Asn Thr Leu Leu Asp Ile Ala Gln Ala Asn Leu Gly Glu Ala Ala
 65 70 75 80
 Gly Thr Tyr Val Ala Ala Asp Ala Ala Ala Ser Ser Tyr Thr Gly
 85 90 95
 Phe

<210> 20

<211> 303
 <212> DNA
 <213> M Tuberculosis

<220>
 <221> CDS
 <222> (1)...(303)

<400> 20

atg aac gca gac ccc gtg ttg tcg tac aac ttt gac gcc atc gaa tac
 48
 Met Asn Ala Asp Pro Val Leu Ser Tyr Asn Phe Asp Ala Ile Glu Tyr
 1 5 10 15

tcc gtt cgt cag gag atc cac acc acc gcg gcc cgt ttc aac gct gcg
 96
 Ser Val Arg Gln Glu Ile His Thr Thr Ala Ala Arg Phe Asn Ala Ala
 20 25 30

ctg caa gag ctg agg tcg cag atc gcg ccg ttg cag cag ctc tgg aca
 144
 Leu Gln Glu Leu Arg Ser Gln Ile Ala Pro Leu Gln Gln Leu Trp Thr
 35 40 45

cg gaa gcg gcc gac tac cac gcg gag caa ctc aag tgg cac cag
 192
 Arg Glu Ala Ala Ala Ala Tyr His Ala Glu Gln Leu Lys Trp His Gln
 50 55 60

gcg gcc agc gcg ctc aac gag atc ctg atc gac ttg gga aac gcg gtt
 240
 Ala Ala Ser Ala Leu Asn Glu Ile Leu Ile Asp Leu Gly Asn Ala Val
 65 70 75 80

cgc cac ggt gcc gac gac gtg gcg cat gcc gac cgg cgg gcg gct gga
 288
 Arg His Gly Ala Asp Asp Val Ala His Ala Asp Arg Arg Ala Ala Gly
 85 90 95

gct tgg gca cgc tag
 303
 Ala Trp Ala Arg *
 100

<210> 21
 <211> 100
 <212> PRT
 <213> M Tuberculosis

<400> 21

Met Asn Ala Asp Pro Val Leu Ser Tyr Asn Phe Asp Ala Ile Glu Tyr
 1 5 10 15
 Ser Val Arg Gln Glu Ile His Thr Thr Ala Ala Arg Phe Asn Ala Ala
 20 25 30
 Leu Gln Glu Leu Arg Ser Gln Ile Ala Pro Leu Gln Gln Leu Trp Thr
 35 40 45
 Arg Glu Ala Ala Ala Ala Tyr His Ala Glu Gln Leu Lys Trp His Gln
 50 55 60
 Ala Ala Ser Ala Leu Asn Glu Ile Leu Ile Asp Leu Gly Asn Ala Val

65 70 75 80
Arg His Gly Ala Asp Asp Val Ala His Ala Asp Arg Arg Ala Ala Gly
85 90 95
Ala Trp Ala Arg
100

<210> 22
<211> 378
<212> DNA
<213> M Tuberculosis

<220>
<221> CDS
<222> (1) ... (378)

<400> 22

ttg gtt gaa ccg gga agg atc gga ggg aac cag acg agg ttg gcg gcg

48

Leu Val Glu Pro Gly Arg Ile Gly Gly Asn Gln Thr Arg Leu Ala Ala
1 5 10 15

gtc cta ctt gat gtg agc aca ccg aac acg ctg aac gcc gac ttt gac
96

Val Leu Leu Asp Val Ser Thr Pro Asn Thr Leu Asn Ala Asp Phe Asp
20 25 30

ctg atg cgt tcg gtt gcg ggt atc acg gac gcc cgc aat gag gaa atc
144

Leu Met Arg Ser Val Ala Gly Ile Thr Asp Ala Arg Asn Glu Glu Ile
35 40 45

cgt gcg atg ctg cag gca ttc atc ggc cgc atg agc ggt gtg ccg ccg
192

Arg Ala Met Leu Gln Ala Phe Ile Gly Arg Met Ser Gly Val Pro Pro
50 55 60

tcg gtg tgg ggt ggg ctc gcg gcc gct cgg ttc cag gat gtg gtg gat
240

Ser Val Trp Gly Gly Leu Ala Ala Ala Arg Phe Gln Asp Val Val Asp
65 70 75 80

cgc tgg aac gcc gag tcg acg cgg ctc tac cac gtc ctg cac gcg atc
288

Arg Trp Asn Ala Glu Ser Thr Arg Leu Tyr His Val Leu His Ala Ile
85 90 95

gcc gac acc atc cgc cac aac gag gcc gcg ctg cgg gaa gcc ggc caa
336

Ala Asp Thr Ile Arg His Asn Glu Ala Ala Leu Arg Glu Ala Gly Gln
100 105 110

atc cat gcc cgc cac atc gcc gcc ggc gac cta tag
378

Ile His Ala Arg His Ile Ala Ala Gly Gly Asp Leu *
115 120 125

<210> 23
<211> 125
<212> PRT

<213> M Tuberculosis

<400> 23

Met Val Glu Pro Gly Arg Ile Gly Gly Asn Gln Thr Arg Leu Ala Ala
1 5 10 15
Val Leu Leu Asp Val Ser Thr Pro Asn Thr Leu Asn Ala Asp Phe Asp
20 25 30
Leu Met Arg Ser Val Ala Gly Ile Thr Asp Ala Arg Asn Glu Glu Ile
35 40 45
Arg Ala Met Leu Gln Ala Phe Ile Gly Arg Met Ser Gly Val Pro Pro
50 55 60
Ser Val Trp Gly Gly Leu Ala Ala Ala Arg Phe Gln Asp Val Val Asp
65 70 75 80
Arg Trp Asn Ala Glu Ser Thr Arg Leu Tyr His Val Leu His Ala Ile
85 90 95
Ala Asp Thr Ile Arg His Asn Glu Ala Ala Leu Arg Glu Ala Gly Gln
100 105 110
Ile His Ala Arg His Ile Ala Ala Gly Gly Asp Leu
115 120 125

<210> 24

<211> 288

<212> DNA

<213> M Tuberculosis

<220>

<221> CDS

<222> (1)...(288)

<400> 24

atg tca gat caa atc acg tat aac ccg gga gcc gta tcc gac ttc gct
48
Met Ser Asp Gln Ile Thr Tyr Asn Pro Gly Ala Val Ser Asp Phe Ala
1 5 10 15

tcc gac gtg ggc tcg cgc gcc ggc cag ctc cac atg att tac gaa gac
96
Ser Asp Val Gly Ser Arg Ala Gly Gln Leu His Met Ile Tyr Glu Asp
20 25 30

acc gcc agc aaa aca aat gcg ctg caa gag ttt ttc gcg ggc cac ggc
144
Thr Ala Ser Lys Thr Asn Ala Leu Gln Glu Phe Phe Ala Gly His Gly
35 40 45

gcg caa ggg ttt ttc gac gcc cag gcg cag atg ctg tcg ggg ctg cag
192
Ala Gln Gly Phe Phe Asp Ala Gln Ala Gln Met Leu Ser Gly Leu Gln
50 55 60

ggg ctc att gag acg gtg ggt cag cat ggg act acc acc ggc cac gtg
240
Gly Leu Ile Glu Thr Val Gly Gln His Gly Thr Thr Thr Gly His Val
65 70 75 80

ctg gac aac gcg atc gga acc gac cag gcc atc gcg ggc ttg ttc taa
288
Leu Asp Asn Ala Ile Gly Thr Asp Gln Ala Ile Ala Gly Leu Phe *
85 90 95

<210> 25
 <211> 95
 <212> PRT
 <213> M Tuberculosis

<400> 25
 Met Ser Asp Gln Ile Thr Tyr Asn Pro Gly Ala Val Ser Asp Phe Ala
 1 5 10 15
 Ser Asp Val Gly Ser Arg Ala Gly Gln Leu His Met Ile Tyr Glu Asp
 20 25 30
 Thr Ala Ser Lys Thr Asn Ala Leu Gln Glu Phe Phe Ala Gly His Gly
 35 40 45
 Ala Gln Gly Phe Phe Asp Ala Gln Ala Gln Met Leu Ser Gly Leu Gln
 50 55 60
 Gly Leu Ile Glu Thr Val Gly Gln His Gly Thr Thr Gly His Val
 65 70 75 80
 Leu Asp Asn Ala Ile Gly Thr Asp Gln Ala Ile Ala Gly Leu Phe
 85 90 95

<210> 26
 <211> 324
 <212> DNA
 <213> M Tuberculosis

<220>
 <221> CDS
 <222> (1)...(324)

<400> 26
 gtg gca gac aca att cag gta aca ccg cag atg ctg cgc agc acc gcc
 48
 Val Ala Asp Thr Ile Gln Val Thr Pro Gln Met Leu Arg Ser Thr Ala
 1 5 10 15
 aac gat atc cag gcg aat atg gag caa gcc atg gga atc gcc aag ggc
 96
 Asn Asp Ile Gln Ala Asn Met Glu Gln Ala Met Gly Ile Ala Lys Gly
 20 25 30
 tac cta gcc aac cag gaa aac gtc atg aac ccc gcc acc tgg tct ggt
 144
 Tyr Leu Ala Asn Gln Glu Asn Val Met Asn Pro Ala Thr Trp Ser Gly
 35 40 45
 acc ggc gtc gtt gct tcg cat atg aca gcc acc gag atc acc aat gaa
 192
 Thr Gly Val Val Ala Ser His Met Thr Ala Thr Glu Ile Thr Asn Glu
 50 55 60
 ttg aac aag gtc ctt acc ggg ggc acg cgc ctg gcc gag ggc ctc gtg
 240
 Leu Asn Lys Val Leu Thr Gly Gly Thr Arg Leu Ala Glu Gly Leu Val
 65 70 75 80
 cag gcc gca gcc ctg atg gag gga cac gag gcg gac tcg cag aca gcg
 288
 Gln Ala Ala Ala Leu Met Glu Gly His Glu Ala Asp Ser Gln Thr Ala
 85 90 95

ttt cag gcg ctg ttc ggc gct agc cac gga tcc tga
 324
 Phe Gln Ala Leu Phe Gly Ala Ser His Gly Ser *
 100 105

<210> 27
 <211> 107
 <212> PRT
 <213> M Tuberculosis

<400> 27
 Met Ala Asp Thr Ile Gln Val Thr Pro Gln Met Leu Arg Ser Thr Ala
 1 5 10 15
 Asn Asp Ile Gln Ala Asn Met Glu Gln Ala Met Gly Ile Ala Lys Gly
 20 25 30

Tyr Leu Ala Asn Gln Glu Asn Val Met Asn Pro Ala Thr Trp Ser Gly
 35 40 45

Thr Gly Val Val Ala Ser His Met Thr Ala Thr Glu Ile Thr Asn Glu
 50 55 60

Leu Asn Lys Val Leu Thr Gly Gly Thr Arg Leu Ala Glu Gly Leu Val
 65 70 75 80

Gln Ala Ala Ala Leu Met Glu Gly His Glu Ala Asp Ser Gln Thr Ala
 85 90 95

Phe Gln Ala Leu Phe Gly Ala Ser His Gly Ser
 100 105

<210> 28
 <211> 273
 <212> DNA
 <213> M Tuberculosis

<220>
 <221> CDS
 <222> (1)...(273)

<400> 28
 gtg gat ccg acc gtg ttg gct gat gcg gtg gcg cggt atg gcc gaa ttc
 48
 Val Asp Pro Thr Val Leu Ala Asp Ala Val Ala Arg Met Ala Glu Phe
 1 5 10 15

ggt cgc cac gtc gag gag ctg gtc gcc gag att gag tcc ttg gtt acc
 96
 Gly Arg His Val Glu Glu Leu Val Ala Glu Ile Glu Ser Leu Val Thr
 20 25 30

cggt ctg cat gtg acg tgg acg ggg gag ggc gcg gcg gct cat gct gag
 144
 Arg Leu His Val Thr Trp Thr Gly Glu Gly Ala Ala Ala His Ala Glu
 35 40 45

gcg caa cga cat tgg gct gcc ggt gag gcg atg atg cgc cag gcg ttg
 192
 Ala Gln Arg His Trp Ala Ala Gly Glu Ala Met Met Arg Gln Ala Leu
 50 55 60

gcc cag ctc acg gcc gcg ggg cag agc gcg cac gcc aac tac acc ggc
 240
 Ala Gln Leu Thr Ala Ala Gly Gln Ser Ala His Ala Asn Tyr Thr Gly

65

70

75

80

gcg atg gcc acg aat ttg ggt atg tgg tcg tga
273
Ala Met Ala Thr Asn Leu Gly Met Trp Ser *
85 90

<210> 29
<211> 90
<212> PRT
<213> M Tuberculosis

<400> 29
Met Asp Pro Thr Val Leu Ala Asp Ala Val Ala Arg Met Ala Glu Phe
1 5 10 15
Gly Arg His Val Glu Glu Leu Val Ala Glu Ile Glu Ser Leu Val Thr
20 25 30
Arg Leu His Val Thr Trp Thr Gly Glu Gly Ala Ala Ala His Ala Glu
35 40 45
Ala Gln Arg His Trp Ala Ala Gly Glu Ala Met Met Arg Gln Ala Leu
50 55 60
Ala Gln Leu Thr Ala Ala Gly Gln Ser Ala His Ala Asn Tyr Thr Gly
65 70 75 80
Ala Met Ala Thr Asn Leu Gly Met Trp Ser
85 90

<210> 30
<211> 312
<212> DNA
<213> M Tuberculosis

<220>
<221> CDS
<222> (1)...(312)

<400> 30
atg ggt gcc gac gac acg ctg cgc gta gag cct gcg gtg atg cag cag ggt
48
Met Gly Ala Asp Asp Thr Leu Arg Val Glu Pro Ala Val Met Gln Gly
1 5 10 15

ttc gcc gcg tcg ttg gat gga gcg gcc gag cat ctc gcg gtt caa ctg
96
Phe Ala Ala Ser Leu Asp Gly Ala Ala Glu His Leu Ala Val Gln Leu
20 25 30

gcc gag ctg gac gct cag gtc ggg cag atg ttg ggc ggg tgg cgc ggg
144
Ala Glu Leu Asp Ala Gln Val Gly Gln Met Leu Gly Gly Trp Arg Gly
35 40 45

gcg tcg ggc agt gcg tat ggc tcg gcg tgg gag cta tgg cat cgc ggg
192
Ala Ser Gly Ser Ala Tyr Gly Ser Ala Trp Glu Leu Trp His Arg Gly
50 55 60

gcc ggt gag gtg cag ctg gga ttg tcg atg ctg gcg gcg gca ata gct
240
Ala Gly Glu Val Gln Leu Gly Leu Ser Met Leu Ala Ala Ile Ala

65

70

75

80

cac gcc ggt gcg ggt tat caa cac aac gag acc gcg tcg gcg cag gtg
288

His Ala Gly Ala Gly Tyr Gln His Asn Glu Thr Ala Ser Ala Gln Val
85 90 95

ctt cgt gag gtg ggc ggt ggc tga

312

Leu Arg Glu Val Gly Gly Gly *
100

<210> 31

<211> 103

<212> PRT

<213> M Tuberculosis

<400> 31

Met Gly Ala Asp Asp Thr Leu Arg Val Glu Pro Ala Val Met Gln Gly
1 5 10 15

Phe Ala Ala Ser Leu Asp Gly Ala Ala Glu His Leu Ala Val Gln Leu
20 25 30

Ala Glu Leu Asp Ala Gln Val Gly Gln Met Leu Gly Gly Trp Arg Gly
35 40 45

Ala Ser Gly Ser Ala Tyr Gly Ser Ala Trp Glu Leu Trp His Arg Gly
50 55 60

Ala Gly Glu Val Gln Leu Gly Leu Ser Met Leu Ala Ala Ala Ile Ala
65 70 75 80

His Ala Gly Ala Gly Tyr Gln His Asn Glu Thr Ala Ser Ala Gln Val
85 90 95

Leu Arg Glu Val Gly Gly Gly
100